Australian Journal of Marine and Freshwater Research

Volume 29

Melbourne 1978

Australian Journal of Marine and Freshwater Research

A medium for original contributions in marine, estuarine, or freshwater research, including oceanography.

Board of Standards

The Board of Standards for this Journal is appointed by the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science and consists of:

L. T. Evans (Chairman)

A. R. H. Cole

R. W. Crompton

B. V. Hamon

G. A. Horridge

L. G. Paleg

A. J. Pittard

J. P. Quirk

B. J. Robinson

D. E. Tribe

C. H. Tyndale-Biscoe

A. B. Wardrop

B. J. Walby (Editor-in-Chief)

Advisory Committee

Acceptance of papers for this Journal is in the hands of an Advisory Committee consisting of a Chairman appointed by the Executive of CSIRO and the Council of the Australian Academy of Science, and members appointed by the Board of Standards.

B. V. Hamon (Chairman)

V. T. Buchwald

W. Dall

D. A. Hancock

B. T. Hart

L. V. Hawkins

P. A. Tyler

W. D. Williams

B. J. Walby (ex officio)

Published in Melbourne for the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science under the editorial control of L. A. Bennett and A. D. Read.

Issued six times a year.

Annual subscription \$A20

Australian Journal of Marine and Freshwater Research

© CSIRO 1978

All enquiries and manuscripts should be forwarded to:

The Editor-in-Chief Editorial and Publications Service CSIRO, 314 Albert Street East Melbourne, Victoria 3002

Indexes to Volume 29

Authors and Titles

Ahsanullah, M., and Arnott, G. H.
Acute toxicity of copper, cadmium and zinc to larvae of the crab
Paragrapsus quadridentatus
(H. Milne Edwards), and implications for water quality criteria

Albani, A. D.

Recent Foraminifera of an estuarine environment in Broken Bay, New South Wales 355

Amin, M.

A statistical analysis of storm surges in Torres Strait 479

Anderson, D. T. See Lawson-Kerr, C. Arnott, G. H. See Ahsanullah, M. Auty, E. H.

Reproductive behaviour and early development of the empire fish Hypseleotris compressus (Eleotridae) 585

Bayly, I. A. E.

The occurrence of *Paralabidocera*antarctica (I. C. Thompson)
(Copepoda : Calanoida : Acartiidae) in
an Antarctic saline lake 817

Bell, J. D., Burchmore, J. J., and Pollard, D. A.

Feeding ecology of a scorpaenid fish, the fortescue *Centropogon australis*, from a *Posidonia* seagrass habitat in New South Wales 175

Feeding ecology of three sympatric species of leatherjackets (Pisces: Monacanthidae) from a *Posidonia* seagrass habitat in New South Wales 631

Bell, J. D. See also Bishop, K. A. Bishop, K. A., and Bell, J. D.

Aspects of the biology of the Australian grayling *Prototroctes maraena* Günther (Pisces: Prototroctidae) 743

Observations on the fish fauna below Tallowa Dam (Shoalhaven River, New South Wales) during river flow stoppages 543

Boag, A. J. See Slater, S. J. E. Buchanan, A. S. See Canterford, G. S. Burchmore, J. J. See Bell, J. D. Campbell, I. C.

A biological investigation of an organically polluted urban stream in Victoria 275
Inputs and outputs of water and phosphorus from four Victorian catchments 577

Campbell, Peter J.

Primary productivity of a hypersaline Antarctic lake 717

Canterford, G. S., Buchanan, A. S., and Ducker, S. C.

Accumulation of heavy metals by the marine diatom *Ditylum brightwellii* (West) Grunow 613

Carter, J. G. T., and Nicholas, W. L.
Uptake of zinc by the aquatic larvae of Simulium ornatipes (Diptera:
Nematocera) 299

Coleman, N., Cuff, W., Drummond, M., and Kudenov, J. D.

A quantitative survey of the macrobenthos of Western Port, Victoria 445

Coomans, A. See Decraemer, W. Cowper, T. R. See Grant, C. J.

Cresswell, G. R., and Greig, M. A.

Currents and water properties in the north-central Great Barrier Reef during the south-east trade wind season 345 Cuff, W. See Coleman, N.

Decraemer, W., and Coomans, A.
Scientific report on the Belgian expedition
to the Great Barrier Reef in 1967.

Nematodes XII. Ecological notes on the nematode fauna in and around mangroves on Lizard Island 497

Nematodes XIII. A description of four new species and a redescription of four known species from in and around mangroves on Lizard Island 509

de Forest, A., Murphy, S. P., and Pettis, R. W.

Heavy metals in sediments from the central New South Wales coastal region 777

de Forest, A., Pettis, R. W., and Fabris, G.
Analytical acceptability of trace metal
levels found in oceanic waters around
Australia 193

Drummond, M. See Coleman, N. Ducker, S. C. See Canterford, G. S.

Easton, A. K.

A reappraisal of the tides in Spencer Gulf, South Australia 467

Fabris, G. See de Forest, A. Fulton, W.

A description of a new species of Galaxias (Pisces : Galaxiidae) from Tasmania 109

Fulton, W. See also McDowall, R. M.

Gilmartin, Malvern. See Revelante, Noelia Glaister, J. P.

Movement and growth of tagged school prawns, *Metapenaeus macleayi* (Haswell) (Crustacea: Penaeidae), in the Clarence River region of northern New South Wales 645

The impact of river discharge on distribution and production of the school prawn Metapenaeus macleayi (Haswell) (Crustacea: Penaeidae) in the Clarence River region, northern New South Wales 311

Golding, T. J., and Symonds, G. Some surface circulation features off Western Australia during 1973–1976 187

Grant, C. J., Cowper, T. R., and Reid, D. D.
Age and growth of snoek, *Leionura atun*(Euphrasen), in south-eastern Australian
waters 435

Greig, M. A. See Cresswell, G. R.

Heald, David

A successful marking method for the saucer scallop *Amusium balloti* (Bernardi) 845

Holmes, J. C. See Redfield, J. A. Holmes, R. D. See Redfield, J. A.

Humphrey, G. F.

The recalculation of marine chlorophyll concentrations with special reference to Australian waters 409

Jackson, P. D.

Benthic invertebrate fauna and feeding relationships of brown trout, Salmo trutta Linnaeus, and river blackfish, Gadopsis marmoratus Richardson, in the Aberfeldy River, Victoria 725

Spawning and early development of the river blackfish, *Gadopsis marmoratus*Richardson (Gadopsiformes: Gadopsidae), in the McKenzie River,
Victoria 293

Johnson, W. David, See Muir, Gregory L.; Toomer, Philip B.

Joll, L. M.

Observations on the embryonic development of *Octopus tetricus* (Mollusca: Cephalopoda) 19

Knott, B., Suter, P. J., and Richardson, A. M. M.

A preliminary observation on the littoral rock fauna of Hartz Lake and Hartz Creek, southern Tasmania, with notes on the water chemistry of some neighbouring lakes 703

Kudenov, J. D. See Coleman, N.; Poore, Gary C. B.

Lansbury, I.

A review of *Goondnomdanepa* Lansbury (Heteroptera: Nepidae) 117

Lawson-Kerr, C., and Anderson, D. T.
Reproduction, spawning and development
of the starfish *Patiriella exigua* (Lamarck)
(Asteroidea: Asterinidae) and some
comparisons with *P. calcar* (Lamarck) 45

Lenanton, R. C. J.

Age, spawning time, and fecundity of
Australian herring (*Arripis georgianus*C. & V.) (Pisces : Arripidae) from the
waters around Rottnest Island,
Western Australia 599

MacDonald, C. M.

Morphological and biochemical systematics of Australian freshwater and estuarine percichthyid fishes 667

Marshall, K. C. See Roper, Margaret M. McDowall, R. M., and Fulton, W.

A further new species of *Paragalaxias*Scott (Salmoniformes : Galaxiidae) from
Tasmania with a revised key to the
species 659

A revision of the genus *Paragalaxias* Scott (Salmoniformes : Galaxiidae) 93

Mitchell, B. D.

Cyclomorphosis in *Daphnia carinata* King (Crustacea: Cladocera) from two adjacent sewage lagoons in South Australia 565

Morgan, G. R.

Locomotor activity in the western rock lobster, *Panulirus longipes cygnus* 169

Muir, Gregory L., and Johnson, W. David Chemistry of the Bogan River, New South Wales, with special reference to the sources of dissolved material 399

Mulley, J. C. See Shearer, K. D. Murphy, S. P. See de Forest, A.

Neboiss, Arturs

A review of caddis flies from three coastal islands of south-eastern Queensland (Insecta: Trichoptera) 825

Nicholas, W. L. See Carter, J. G. T.

Nyan Taw and Ritz, D. A.

Zooplankton distribution in relation to the hydrology of the Derwent River estuary 763

Ottaway, J. R.

Population ecology of the intertidal anemone *Actinia tenebrosa*.

I. Pedal locomotion and intraspecific aggression 787

Pettis, R. W. See de Forest, A. Pollard, D. A. See Bell, J. D.

Poore, Gary C. B., and Kudenov, Jerry D. Benthos around an outfall of the Werribee sewage-treatment farm, Port Phillip Bay, Victoria 157

Benthos of the Port of Melbourne: the Yarra River and Hobsons Bay, Victoria 141

Pregenzer, C., Jr.

Pinnotheres hickmani (Guiler) in wild and cultured Mytilus edulis in Port Phillip Bay, Victoria 127

Redfield, J. A., Holmes, J. C., and Holmes, R. D.

Sea snakes of the eastern Gulf of Carpentaria 325

Reid, D. D. See Grant, C. J.

Revelante, Noelia, and Gilmartin, Malvern Characteristics of the microplankton and nanoplankton communities of an Australian coastal plain estuary 9

Richardson, A. M. M. See Knott, B.

Ritz, D. A. See Nyan Taw

Roper, Margaret M., and Marshall, K. C. Biological control agents of sewage bacteria in marine habitats 335 Scott, B. D.

Nutrient cycling and primary production in Port Hacking, New South Wales 803

Phytoplankton distribution and light attenuation in Port Hacking estuary

Shearer, K. D., and Mulley, J. C.
The introduction and distribution of the carp, Cyprinus carpio Linnaeus, in
Australia 551

Slater, S. J. E., and Boag, A. J.

The phosphorus status of the sediments of three eutrophic lakes in Victoria 263

Stanley, C. A.

Area of distribution, movements, age composition and mortality rates of the Australian salmon population in Tasmania, Victoria and New South Wales 417

Suter, P. J. See Knott, B. Symonds, G. See Golding, T. J.

Toomer, Philip B., and Johnson, W. David A modified geometric method of hydrochemical investigations 259

Viets, Kurt O.

New water mites (Hydrachnellae : Acari) from Australia 77

Walker, M. H.

Food and feeding habits of *Lethrinus*chrysostomus Richardson (Pisces:
Perciformes) and other lethrinids on
the Great Barrier Reef 623

Wells, Fred E.

Distribution of thecosomatous pteropods off the central coast of Western Australia 853

Williams, M. J.

Opening of bivalve shells by the mud crab Scylla ser ata Forskål 699

Womersley, H. B. S.

Southern Australian species of Ceramium Roth (Rhodophyta) 205

Young, P. C.

Moreton Bay, Queensland: a nursery area for juvenile penaeid prawns 55

Subject Index

Aberfeldy River, Vic., benthic invertebrate fauna and feeding relationships of brown trout and river blackfish 725

Actinia tenebrosa, population ecology of 787

Amusium balloti, a successful marking method for 845

Analytical acceptability of trace metal levels found in oceanic waters around Australia 193

Anemone, see Actinia tenebrosa
Antarctic hypersaline lake, primary
productivity of 717

Antarctic saline lake, occurrence of Paralabidocera artarctica in 817 Arripis georgianus from the waters around

Arripis georgianus from the waters around Rottnest Island, W.A., age, spawning time and fecundity of 599

Australian grayling, see Prototroctes maraena Australian herring, see Arripis georgianus

Australian salmon population in Tasmania, Victoria and New South Wales, area of distribution, movements, age composition and mortality rates of 417

Belgian expedition to the Great Barrier Reef in 1967. Nematodes XII, XIII 497, 509 Benthos around an outfall of the Werribee sewage-treatment farm, Port Phillip Bay 157

Benthos of the Port of Melbourne: the Yarra River and Hobsons Bay 141 Bivalve shells, opening of, by the mud crab Scylla serrata 699

Bogan River, N.S.W., chemistry of 399 Broken Bay, N.S.W., Recent Foraminifera of an estuarine environment in 355 Brown trout, see Salmo trutta

Caddis flies from three coastal islands of south-eastern Queensland 825

Cadmium toxicity to larvae of the crab

Paragrapsus quadridentatus 1

Carp, see Cyprinus carpio Centropogon australis from a Posidonia seagrass habitat in New South Wales,

feeding ecology of 175

Ceramium Roth, southern Australian species of 205

Chemistry of the Bogan River, N.S.W., with special reference to the sources of dissolved material 399

Chlorophyll concentrations, marine, recalculation of 409

Clarence River region, northern N.S.W.:
Impact of river discharge on distribution
and production of the school prawn 311
Movement and growth of tagged school
prawns 645

Copper toxicity to larvae of the crab

Paragrapsus quadridentatus 1

Currents and water properties in the north-central Great Barrier Reef during the south-east trade wind season 345

Cyclomorphosis in *Daphnia carinata* from two adjacent sewage lagoons in South Australia 565

Cyprinus carpio, introduction and distribution of 551

Dandenong Creek, a biological investigation of 275

Daphnia carinata, cyclomorphosis in 565
Derwent River estuary, zooplankton distribution in relation to the hydrology of 763

Diatom Ditylum brightwellii, heavy metal accumulation by 613
Ditylum brightwellii, heavy metal accumulation by 613

Embryonic development of *Octopus tetricus* 19
Empire fish, *see Hypseleotris compressus*

Foraminifera, Recent, of an estuarine environment in Broken Bay, N.S.W. 355
Fortescue, see Centropogon australis

Gadopsis marmoratus:

River, Vic. 725

Snawning and early development of in

Spawning and early development of, in the McKenzie River, Vic. 293

Galaxias, a new species of, from Tasmania 109

Geometric method of hydrochemical investigations 259

Goondnomdanepa Lansbury, a review of 11' Great Barrier Reef:

Belgian expedition to, in 1967 497, 509 Food and feeding habits of lethrinids from 623

North-central, currents and water properties in, during the south-east trade wind season 345

Grayling, Australian, see Prototroctes maraena Gulf of Carpentaria, eastern, sea snakes of 325 Hartz Lake and Hartz Creek, southern
Tas., littoral rock fauna of 703

Heavy metal accumulation by the marine
diatom Ditylum brightwellii 613

Heavy metals in sediments from the central
New South Wales coastal region 777

Herring, Australian, see Arripis georgianus
Hobsons Bay benthos 141

Hypseleotris compressus, reproductive
behaviour and early development of 585

Leatherjackets, feeding ecology of three sympatric species, from a *Posidonia* seagrass habitat in New South Wales 631

Leionura atun, age and growth of, in southeastern Australian waters 435

Lethrinus chrysostomus, food and feeding habits of 623

Lizard Island mangroves, nematodes from in

and around 497, 509
Lobster, western rock, see Panuliris longipes

cygnus
Locomotor activity in the western rock
lobster, Panulirus longipes cygnus 169

Macrobenthos of Western Port, Vic., a quantitative survey of 445
McKenzie River, Vic., spawning and early development of the river blackfish in 29
Metapenaeus macleayi:

Impact of river discharge on distribution and production of, in the Clarence River region 311

Movement and growth of, in the Clarence River region 645

Microplankton and nanoplankton communities of an Australian coastal plain estuary 9

Moreton Bay, Queensland: a nursery area for juvenile penaeid prawns 55

Mud crab, see Scylla serrata

Mytilus edulis, Pinnotheres hickmani in, in Port Phillip Bay 127

Nanoplankton and microplankton communities of an Australian coastal plain estuary 9

Nematodes from in and around mangroves on Lizard Island 497, 509 Nutrient cycling and primary production in Port Hacking, N.S.W. 803

Octopus tetricus, embryonic development of 19

Panulirus longipes cygnus, locomotor activity in 169

Paragalaxias, a new species of, from Tasmania 659

Paragalaxias Scott, a revision of 93
Paragrapsus quadridentatus, acute toxicity of copper, cadmium and zinc to larvae of 1

Paralabidocera antarctica, occurrence in an Antarctic saline lake 817

Patiriella exigua reproduction, spawning and development, and some comparisons with P. calcar 45

Patiriella calcar, comparisons with P. exigua in reproduction, spawning and development 45

Penaeid prawns, juvenile, in Moreton Bay, Queensland 55

Percichthyid fishes, freshwater and estuarine, morphological and biochemical systematics of 667

Phosphorus and water inputs and outputs from four Victorian catchments 577

Phosphorus status of the sediments of three eutrophic lakes in Victoria 263

Phytoplankton distribution and light attenuation in Port Hacking estuary 31

Pinnotheres hickmani in wild and cultured Mytilus edulis in Port Phillip Bay 127

Mytilus edulis in Port Phillip Bay 12'
Port Hacking, N.S.W.:

Nutrient cycling and primary production in 803

Phytoplankton distribution and light attentuation in the estuary 31

Port of Melbourne, benthos: the Yarra River and Hobsons Bay 141 Port Phillip Bay:

Benthos around an outfall of the Werribee sewage-treatment farm 157

Pinnotheres hickmani in wild and cultured
Mytilus edulis 127

Posidonia seagrass habitat in N.S.W.:

Feeding ecology of Centropogon australis from 175

Feeding ecology of three sympatric species of leatherjackets 631

Prawns, juvenile penaeid, in Moreton Bay, Queensland 55

Prawns, school, see Metapenaeus macleayi
Prototroctes maraena, biology of 743
Pteropods, thecosomatous, distribution off the
central coast of Western Australia 853

Recent Foraminifera of an estuarine environment in Broken Bay, N.S.W. 355
River blackfish, see Gadopsis marmoratus
Rottnest Island, W.A., age, spawning time and fecundity of Australian herring

from 599

- Salmon, see Australian salmon
 Salmo trutta, feeding relationships of, in
 the Aberfeldy River, Vic. 725
 Saucer scallop, see Amusium balloti
 School prawns, see Metapenaeus macleayi
 Scylla serrata, opening of bivalve shells by 699
 Seagrass, see Posidonia
- Carpentaria 325 Sewage bacteria in marine habitats, biological control agents of 335

Sea snakes of the eastern Gulf of

- Sewage lagoons in South Australia, cyclomorphosis in *Daphnia carinata* from 565
- Simulium ornatipes, uptake of zinc by the aquatic larvae of 299
- Snoek, see Leionura atun Spencer Gulf, S.A., a reappraisal of the tides in 467
- Starfish (*Patiriella exigua*), reproduction, spawning and development of 45
- Storm surges in Torres Strait, a statistical analysis of 479
 Surface circulation features off Western

Australia during 1973–1976

Tallowa Dam (Shoalhaven River, N.S.W.), observations on fish fauna below, during river flow stoppages 543

- Thecosomatous pteropods, distribution off the central coast of Western Australia 853 Tides in Spencer Gulf, S.A., a reappraisal of 467
- Torres Strait storm surges, a statistical analysis of 479
- Trace metal levels found in oceanic waters around Australia, analytical acceptability of 193
 Trout, brown, see Salmo trutta
- Water and phosphorus inputs and outputs from four Victorian catchments 577 Water mites from Australia 77
- Werribee sewage-treatment farm, benthos around an outfall of 157
- Western Port, Vic., a quantitative survey of the macrobenthos of 445
- Western rock lobster, see Panulirus longipes cygnus
- Yarra River benthos 141
- Zinc toxicity to larvae of the crab

 Paragrapsus quadridentatus 1
- Zinc uptake by the aquatic larvae of Simulium ornatipes 299
- Zooplankton distribution in relation to the hydrology of the Derwent River estuary 763

Index: Volumes 1-25

A consolidated index of Volumes 1–25 (1950–1974) of the Australian Journal of Marine and Freshwater Research has been prepared in line print-out form by Dr A. A. Day, Department of Geology and Geophysics, University of Sydney. It is Report 1977/1 in the Geological Sciences. Copies may be obtained free of charge from the Secretary, Department of Geology and Geophysics, University of Sydney, N.S.W. 2006.

